British Ferns

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Aspidium
Aculeatum
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A

PLAIN AND EASY ACCOUNT

OF

THE BRITISH FERNS.

WHEREIN

EACH SPECIES IS PARTICULARLY DESCRIBED UNDER ITS RESPECTIVE GENUS, AND THE CHARACTERISTICS OF THOSE GENERA GIVEN IN WORDS OF COMMON USE.

WITH

A GLOSSARY OF TECHNICAL AND OTHER TERMS,

SERVING AS A KEY TO LARGER TREATISES.

Second Edition.

ENLARGED AND RE-ARRANGED.

WITH ILLUSTRATIONS.

LONDON:

ROBERT HARDWICKE, 26, DUKE ST., PICCADILLY.

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ROBERT HARDWICKE, 26, DUKE STREET, PICCADILLY

PREFACE.

The works from which, though with occasional differences, this Outline of our British Ferns is mainly compiled, were spoken of at large in the former edition, namely, 'An Analysis of the British Ferns,' by George Francis, F.L.S. London: Simpkin, Marshall, and Co., Stationers'-hall Court. Sowerby's 'English Botany,' Class XXIV, Cryptogamia, Order I, Filices, pp. 29, pl. 43. 'A Handbook of British Ferns,' by Thomas Moore, F.L.S. Groombridge, Paternoster Row; and Pamplin, Frith Street, Soho; and 'A Popular History of the British Ferns,' by the same, Reeve and Benham, Henrietta Street, Covent Garden: all of them to be strongly recommended to any one desirous of more fully studying the subject: the first, for his definitions, and exhibitions of genera; the second, for the plates; the third, for details and culture; the last, for habitats. To such as wish for a yet simpler guide, the present may prove not altogether useless; the description of each species being given in words of common use, and the technical language of the above, so puzzling to a beginner, avoided: except so far that it has now been preferred to designate the lateral

offshoot from the stem, whether perfect branch or perfect leaf, by its proper name of *Pinna;* and the foliage on the branches, when formed into a distinct and separate number, by that of *Pinnule;* when connected with them in its whole breadth, by the (may I hope excusable, though unauthorised?) diminutive of *Pinnulet.* A fresh, alphabetical, arrangement has also been adopted, the months when the young yearly fronds may usually be expected appended to each species, and other advisable alterations and additions made throughout. The plates will be found to convey a clear general idea of each plant, figured; the details being, of course, to be sought for from the letter-press.

N.B. As all pinnæ growing at right angles to a vertical stem must, necessarily, so far be horizontal in their *length,* it may be well to note, that by the term, *as applied herein,* is intended that, instead of lying in the same plane with that main stem, they are so turned, as to present the front *breadth* of their surface or foliage facing the sky, being, in fact, supine.

EDWIN BOSANQUET.

Forscote Rectory, Somersetshire,
August 1855.

INTRODUCTION.

Among our indigenous plants there are few that more invite and reward our care, than the tribe of Ferns. The commoner, but not therefore less striking, kinds are easily transplanted at any season. All are perennials,* and require but ordinary attention to prosper. Nor is it a slight recommendation to their study and cultivation, that our native species may be comprised in about five-and-forty, the genera being put at sixteen: so that we have an easy limit both to our inquiries and our acquisition. As our companions in the drawing-room during the winter, they will thrive under glass, demanding neither successive watering there, nor change

* An exception may be made of a little annual lately found in Jersey—the Gymnogramma Leptophylla. Root tufted. From 3 to 6 inches. Very delicate, short, pinnæ, with tiny fan or wedge-shaped pinnules, scalloped above. Sori linear, afterwards somewhat round, uniting, and covering the whole under surface. Taller, larger, and more compound, in foreign parts. A full account and figure of this is given in the last edition of Moore's 'Handbook,' which is improved by a tabular arrangement of the districts in which each British species is indigenous respectively.

of air. Very graceful in their feathery form, and elegant in their waving varieties of foliage, when once shooting up in the spring they continue in verdure to live down whole families of their gaudier rivals; yielding at length only to the frosts of late autumn, and many persisting even then, especially in protected situations.

And during this time they are a source of renewed interest in their fresh and fresh growth and development. First, we have a flattish or roundish crosier just peeping above its parent soil; then, ere long, we see the head thicken in the inner fold, and gradually throw out little wings below (themselves, in the more complicate sorts, being similarly curled up at their ends, and afterwards, duly in their turn, evolving themselves), which next it leaves behind, slowly unrolling itself upwards from them; then another pair, and then the higher progress again; and so on, till the complete frond or separate shoot, with its pinnæ, pinnules, &c., stands forth in its full youthful shape, to be expanded more widely day by day up to its perfect form.

The classification of this tribe is according to their fructification (the seed-vessels, their dis-

position, and appendages), and this, therefore, is the first thing to be looked to for discovering the genus; and for this purpose, and in order to become fully acquainted with the beauties, and discover clearly the minuter features, of our subject, it were advisable to provide one's self with a magnifying lens, a pocket "Coddington," for example, which may be had for about a crown. In deciding afterwards on the individual species, which a little practice can alone teach correctly, it must, however, be borne in mind, that though each may have one ordinary or typical form, yet, from soil, situation, locality, and other causes, variations will oftentimes occur; nor do the very young plants at first present all the complete points of their respective characters; however, still their identity may be traced through these occasional modifications.

To proceed, then, to their fructification. The dust-like and almost invisible seeds, or *spores*, of Ferns are contained in little cases, or *thecæ*,*

* The tint of both of these changes, of course, in ripening; the latter also, retaining to the end something of their transparency, often seem of the hue of the former while yet containing them, though after their departure perceived to be really of their own dusky brown or reddish colour.

of a roundish shape; which are themselves encircled (except in the instances of Osmunda, Botrychium, and Ophioglossum, where it is wanting) by a jointed ring, horizontal in Trichomanes and Hymenophyllum, and vertical in the rest; the elasticity of which eventually bursts open the theeæ, and scatters the spores when mature. The links of this ring, and its operation in breaking, may be plainly seen through the lens above recommended. These theeæ are, in the majority of the genera, arranged on the back of the pinnules, in linear, oblong, or circular, clusters, called *Sori;* either having, or not having, above the mass, a thin skin-like integument—*Indusium*—nearly of the same figure as that mass itself: at first, covering and inclosing the young seed-cases; afterwards torn away at its margin, or cast off. In some instances, however, the plant itself is moreover divided into barren and fertile fronds, either of a distinctly different, or of the same, form, only that the fertile are rather narrower and less expanded, and come out later. They also, and the fructification otherwise, sometimes do not make their appearance at all after transplantation, until the

stranger has become fully settled in its new home. When this is not the cause, but the specimen itself, though full-grown, naturally assumes a distinctly sterile character, this absence of fruit will often be found counterbalanced (as it is in the case of the separate fronds above) by a greater size or width. As regards culture, Ferns prefer a northern aspect, shade, and shelter, not as indispensable indeed, but as conducing to their finer and more perfect condition, growth, and development. The soil they affect is a mixture of peat-earth and sand, with pebbles intermingled therein, for the roots in many instances to cling thereto; their only manure, that from dried leaves, or the like vegetable matter. For water they are generally thankful, and in setting them especially (which should not be done too deeply, nor the young fronds, already appearing above ground, buried), their beds should be first filled therewith to receive them. In all the wall kinds, the roots are best placed under the protection of the stones among which they are to grow; and in most cases reference may be beneficially made to their natural habits, with a view to a somewhat analogous treatment. It should also be

remembered, that the real feeders are not the main mass of root, so called, but the fibres therefrom. For the drawing-room under glass, of course the evergreens are best chosen, as affording liveliness and verdure during the winter; the closest set together and fullest being most adapted for this purpose; as all plants thus circumstanced are inclined to run to stalk and straggle upwards. Nor can it be expected that they will continue to flourish there, year after year, without the occasional reinvigoration of fresh soil and a renewed atmosphere. Where not sheltered out of doors, the wind sometimes proves a little injurious, or even poisonous as it were, to a few of the young and tender fronds. Too great neatness in trimming off those that have died down at the end of the season is not advisable, as they are a defence to the plant, and the deprivation perhaps rather enfeebles it; and besides, when left to fall off of themselves, they assist other decaying substances around in forming a natural compost for it. Ferns may be raised from seed, carefully potted and managed.

INDEX TO THE GENERA.

*** To find the Fern desired, it is simply necessary to look to its fructification, and then, by casting the eye down the following list, the genus to which it belongs will at once be seen; and afterwards the individual species, name, &c. by referring to the descriptions given under that genus.

NON-INDUSIATE,

OR WITHOUT ANY DISTINCT INDUSIUM BELONGING THERETO.

Sori on the back in lines; back scaly.

GRAMMITIS.

Sori on the back in round masses, perfectly naked.

POLYPODIUM.

Sori circular, beneath the recurved margin of the pinnule.

CRYPTOGRAMMA.

Sori contained in little two-valved vessels, springing from the pinna, and adjoining the stem.

HYMENOPHYLLUM.

Sori contained in entire cups, springing from the pinna, dispersed.

TRICHOMANES.

Sori naked, on a fertile, compoundly-branched, spike, surmounting a succession of barren, leafy, pinnæ.

OSMUNDA.

Sori naked, on a fertile, compoundly-branched, spike, rising above a single, barren, leafy, pinna.

BOTRYCHIUM.

Sori naked, on a fertile, simple, spike.

OPHIOGLOSSUM.

INDUSIATE;

OR WITH A DISTINCT INDUSIUM BELONGING THERETO.

Sori on the back, in round masses. Indusium round like a shield, and fixed in the centre only, as in the family of Lonchitis; or appearing somewhat like a kidney, from having a deep connecting indentation from the centre to the extremity, as in the rest.

ASPIDIUM.

Sori on the back, in round masses. Indusium bladder-shaped, attached under the sori at the part farthest from, and opposite to, the points of the pinnule; eventually retorted, or thrown off entirely.

CISTOPTERIS.

Sori on the back, in round masses. Indusium attached under them, and splitting above into hair-like divisions or fine threads.

WOODSIA.

Sori oval on the inner surface of the Indusium. Indusium a projected continuation of the bleached recurved margin of the pinnule itself.

ADIANTUM.

Sori on the back, in oblique lines. Indusium attached on the outer side.

ASPLENIUM.

Sori on the back, in twin oblique lines. Indusia attached on the outer side, and lapping the one over the other on the inner.

SCOLOPENDRIUM.

Sori on the back, in two longitudinal lines, near the centre. Indusia attached on the outer side, and parted on the inner by the midrib.

BLECHNUM.

Sori on the back, forming a continuous line along the margin. Indusium attached to the slightly recurved edge of the pinnulet.

PTERIS.

BRITISH FERNS.

ADIANTUM.

Sori oval on the inner surface of the Indusium. Indusium a projected continuation of the bleached reeurved margin of the pinnule itself.

Adiantum Capillus Veneris. Fig. 25. (*True Maiden Hair.*) From 4 to 12 inches. Root tufted. Growing in masses, but the fronds separating and arching asunder. A perfect miniature tree. A thin, thread-like, purplish, stem, with yet finer, same coloured, alternate, pinnæ, bearing alternate, smooth, but not polished, stalked, fan-shaped, delicate, pinnules, either simply indented and notched in the barren, or turned over and prolonged into an indusium from their margin in the fertile, ones. Unique in its appearance and texture, and altogether unlike the tribe in general. Sori arranged in oval spots, longest across the Indusium, but soon uniting into a line. May. Sometimes much earlier, December or January.

Evergreen. Not common. Moist caves and rocks near the sea, in the milder parts of England and Ireland. Requires the shelter of glass, but succeeds fairly thereunder. The warmer the room the better. Very graceful and ornamental.

ASPIDIUM.

Sori on the back, in round masses. Indusium round like a shield, and fixed in the centre only, as in the family of Lonchitis; or appearing somewhat like a kidney, from having a deep connecting indentation from the centre to the extremity, as in the rest. Character feathering.

Root tufted in all but Thelypteris.
Round Indusium.

Aspidium Aculeatum. (*Soft Prickly Shield-Fern.*) Fig. 1. From 9 to 15 inches. Growing in circular masses. Texture very thin and light. Dark green. Stem slight. Frond compact, narrow, feather-shaped. Pinnæ running low on the stem, inclining to slant upwards, and, with the pinnules, closely set on, short, and markedly alternate. Pinnules very small, egg-shaped, equably tapering off to a beautiful fineness

above, with a little obtuse elbow, terminating in a minute spine outside at their base, running level with the stem of the pinna; sloping down into a stalk-like junction with that stem, apex directed upwards; the largest and nearest the main stem parallel with it, and leaving an intermediate line of light; much and very delicately toothed throughout, with thin, short hair-like, bristles; rounded altogether to the eye, and without sharpness or angularity. Sometimes, however, more acute, coarser in form, and approaching to Lobatum. Sori very small, and chiefly on the higher pinnæ. Under surface woolly. May. Indeciduous. Not common. Lancashire. Devonshire. Easy of cultivation. Very elegant and graceful.

——— ANGULARE. (*Angular Prickly Shield-Fern.*) Fig. 14. From 2 to 3 feet. Growing in circular masses. Lightish green, but frequently bleached into a healthy yellow. Frond widish, drooping. Pinnæ alternate, though sometimes found opposite, apart, and often falling back at their ends. Pinnules finely and slenderly stalked, flat, oblong, broadish, rather thin and soft, or entirely so, repeatedly, deeply, and obtusely toothed, or even divided, throughout, and rounded upwards to a bluntish point.

Bristles short and numerous, occasionally, however, very thickly and projectingly set. Elbow somewhat obtuse, distinct, and prominent, and in the rather larger superior pinnules next the main stem (which do not ordinarily reach those above) not uncommonly cut down to the midrib. Base of the pinnule bulging down towards the stem of the pinna. Close, round, and compact, in general appearance. Sori near the centre; the vein bearing them terminating at the last cluster. May. Indeciduous. Common. Hardy. Easy of cultivation. Ornamental.

——— Lobatum. (*Close-leaved Prickly Shield-Fern.*) Fig. 4. From 1 to 2 feet. Growing in circular masses. Leathery in substance. Dark green, though often becoming lighter, and even yellowish, by exposure. Frond more or less fullest in the centre; at first concave. Pinnæ alternate, and rather curved upwards, close. Pinnules oblong, with a shorter or wider elbow at their base outside, sharply cut, and gradually narrowed to the apex; which, with the elbow, terminates in a long acute spine; connected with the stem of the pinna either by a long stalk, or mere attenuation of the pinnule itself: *or*, pinnulets rugged, without elbow, being slightly

protuberant at that part, and proportionably scooped out opposite, broad oval, the roundness of the apex interrupted by a sudden point, almost mainly formed by the spine itself: in both patterns large, thick, stout, convex, toothed, bristled, and the pinnule next the main stem much the largest, so as to meet and often partially underlie the pinna above it. Pinnules, pinnulets, and spine of the elbow looking midway between the end of the pinna and of the frond. Variable. Bristles sometimes very frequent, together, and prominent; or pinnules shorter and more angular; or partly compounded of either pattern. Sori towards the centre, on the upper portion of the frond. May. Indeciduous. Common. Hardy. Easy of cultivation. Ornamental. The young plants often nearly resemble Lonchitis.

——— LONCHITIS. (*Holly, or Rough Alpine, Shield-Fern.*) Fig. 3. The simplest form of the genus. From 6 to 16 inches. Growing in masses, and inclining downwards. A main stem, with simple, prickly, undivided, more or less bowed, particularly on the inferior side, in the lower semi-diamond-shaped, rather alternate, crowded, turned, pinnæ, partly underlying their higher neighbour, having a sharp elbow

above next the stem, but at a slight distance from it. Frond narrow, pretty equable, contracted most below, and bearing to the bottom. Sori in two single rows about midway between the margin and centre, on the upper portion of the frond. Very rigid. May. Indeciduous. Rare. Rocks in the North, Scotland, and Wales. Difficult of cultivation, except in a frame. Bold and striking in its outline, but of no particular beauty.

These would seem to belong to the same family: the first three occasionally, in appearance, running more or less the one into the other, so that each may be found here and there partaking of some of the characteristics of its neighbour, while yet preserving its own individuality; and the last being the parent stock, as it were, from which they are expanded. As regards the *vexata quæstio* of Aculeatum, it will be seen that I have ventured to confine the name to the somewhat marked and rarer form first given; instead of extending it, as is more usual, to No. 1, or even both of Lobatum.

Kidney-shaped Indusium.

——— CRISTATUM. (*Crested Shield-Fern.*) Fig. 7. From 1 to 2 feet. Growing in tufts. Pale green. Frond erect, rigid, oblong, narrow. Pinnæ far apart, and

5
Aspidium
Oreopteris
6
pidium
gidum
7
Aspidium
Cristatum
8
Aspidium
Filix Mas

mainly alternate. Stem thick, but slightly scaly, and having no pinnæ for about one-third below. Pinnulets broad, stout, and indented, oblong-rounded, and spinous. When compared with Filix Mas, like the short, fat, robust, Dutch, figure contrasted with the British. Sori running higher on the pinnulet. May. Deciduous. Rare. Only on a few boggy heaths. Likes turfy peat soil and moisture. In the young plants it might often be mistaken for Spinulosum, only more equable in the frond, blunter in the pinnulets, and less bristly.

——— Dilatatum. (*Broad Prickly-toothed Shield-Fern.*) Fig. 10. From 1 to 5 feet. Growing circularly. Dark green, or healthy sappy yellow. Frond verging towards triangular; sometimes few from one root; arching asunder. Stem bare of pinnæ at the bottom. Pinnæ apart, and mainly opposite. Pinnules hardly stalked, convex, or extremely so, and folding back, apart, oblong, much divided and toothed, spinous, roundish at the apex; the inferior larger than the superior; often, especially those on the former side of the lower pinnæ becoming secondary pinnæ themselves. In one form, if, as the name would seem to imply, that be not the original

typieal one, expanded, flattish, or almost recurved, and overlapping. Indusium frequently shrivelling away. Scales on the stem simple, pointed, light brown, with a darker centre. Sori abundant and distinct, in a row on each side of the midrib, and sometimes appearing on the yet undeveloped head. April. Deciduous, but remaining till late in the season. Common in moist woods. Easy of cultivation, and peculiarly graceful and ornamental.

——— Filix Mas. (*Male Shield-Fern.*) Fig. 8. From 2 to 4 feet. Growing in circular masses. Dull green. Pinnæ alternate, and often low down. Frond wide and spreading, but rather contracting below. Stem very scaly at the bottom. Pinnulets oblong, rounded, with their edges slightly notched, and their surface somewhat furrowed. Sori towards the centre, on the upper half of the frond and the lower half of the pinnulets. Rather variable in form. April. Deciduous. Easy of cultivation, and hardy. One of the commonest, and, with a larger bolder sort having its pinnulets more deeply and generally incised all round, to be met with almost every where. From its feathery character and free growth, to be strongly recommended.

——— LOBATUM, p. 18 } as having the indu-
——— LONCHITIS, p. 19 } sium round, &c.

——— ORFOPTERIS. (*Mountain or Heath Shield-Fern.*) Fig. 5. From 2 to 3 feet. Growing in roundish masses. Very brittle. Delicate green. Pinnæ generally opposite, nearly to the bottom, and much narrowed there, more so than towards the apex. Pinnulets smooth, simple, rounded, undivided, and unnotched; at first turned backward in the margin, so that the head before evolved seems like a knot of twisted points, afterwards becoming only rather convex throughout, oblong, and bluntly rounded. On their under surface are small, yellow, shining, glands, emitting (like those of the Polypodium Calcareum) a pleasant flavour when drawn through the hand. Drooping. Somewhat corresponding with Thelypteris, as if that were the female, and this the male, plant; more robust; thicker and larger in its pinnulets. Injured by the wind. To a hasty eye, like the preceding, but detected by the colour, plain edge of pinnulet, &c. &c. Sori marginal. End of May. Early deciduous. Not uncommon on mountainous heaths. Not hardy. Difficult of cultivation. Prefers a sheltered, dry, situation. Best transplanted young and small, and when but

slightly embedded in the soil, as on sloping banks. Of no particular interest, nor, excepting collocation of sori, beauty.

——— Recurvum. (*Triangular Prickly-toothed Shield-Fern.*) Fig. 16. From 12 to 18 inches. Growing in circular masses. Dark green. Frond oblong-triangular. Pinnæ commencing about half way up, mainly opposite, and concave. Pinnules thin, small, and rather narrow, deeply and frequently divided, and toothed; the inferior the greatest; the larger slightly stalked, and sometimes running into secondary pinnæ; the lesser mere pinnulets; a trifle curved forwards in their margins, so as to present a prickly-looking surface, like that of the holly, when viewed slantingly. Scales on the stem split at the top, and of a pale uniform brown. Sori full-sized in proportion, numerous, in a double row. End of May. Indeciduous. Succeeds fairly. Not common. Devonshire. Scotland. Ireland. Very pretty and compact.

——— Rigidum. (*Rigid Shield-Fern.*) Fig. 6. From 1 to 2 feet. Growing in masses. Dull yellowish green. Rather thick in texture. Frond somewhat upright, narrow, and acutely tapering to its apex. Pinnæ mostly alternate. Pinnulets nearly

13
Polypodium
Alpestre
14
Aspidium
Angulare
15
spidium
ulosum
16
Aspidium
Recurvum
17
Asplenium Fontanum
18
Pteris Aquilina

equable, and the inferior generally corresponding with the superior; oblong, round-ended, not spinous, yet being a perfect succession of fine incisions, points, and teeth. Sori rather large, in rows towards the centre, chiefly on the upper half of the frond, and eventually uniting. May. Deciduous. Rare. Confined to a few mountains in the North. Succeeds fairly. Graceful and pretty.

——— SPINULOSUM. (*Lesser Prickly-toothed Shield-Fern.*) Fig. 15. From 8 to 14 inches. Growing in masses and together; moderately erect, and firm. Dry greenish yellow. Pinnæ variable, more generally opposite. Pinnules, or rather chiefly pinnulets, lightly, though very frequently and regularly, toothed. Spinous. Sometimes confounded with Dilatatum, especially when dried;* but when alive, a less succulent-looking plant, and, besides the differ-

* Useful as an Herbarium is in preserving the outlines of each plant, its style, tint, character, appearance, air, texture, relief, and so forth, when fresh and in vegetation, must, of course, be lost in the sameness of one now uniform arid body:—

"It is,
And yet it is not, no more than the shadow,
Upon the hard, cold, flat, and polished, mirror,
Is the warm, graceful, rounded, living, substance
Which it presents in form and lineament."

SIR WALTER SCOTT.

enees above of size, growth, and eolour, the frond is more equable, the pinnulets more running to a point, less eonvex, thinner, more bristled, more angular, not smooth on their surfaee, but furrowed and ridged with lines of the midrib, &e.; not soft, but rigid, and not so mueh separating into seeondary pinnæ. Seales on the stem simple, obtuse, of a yellowish uniform brown. May. Deeiduous. Common. Easy of eultivation, though not taking quite so freely as Dilatatum. Elegant. A larger form is found, rising to 3 feet. Dark green. Flatter, bigger, broader, eoarser, and less delieately toothed and seored.

——— Thelypteris. (*Marsh Shield-Fern.*) Fig. 2. From 6 to 16 inches. Yellowish green. The root disposed to ereep to the surfaee in dry situations. Fronds springing up here and there in masses therefrom; rather ereet, though fragile, slight, and shrivelling together on being gathered; when under trees, stooping forward to the light. Pinnæ mostly alternate. Pinnulets simple, oblong, smooth on the sides, very thin, inelining to pointed, and haviug a sharp angular appearanee, as if eut, from being a trifle rolled baekward on the edge. The inferior next the main stem projeeting in front, so as to form a raised line all

9
Asplenium
Lanceolatum
10
Aspidium
Dilatatum
11
Asplenium
Adiantum
Nigrum
12
Asplenium
Marinum

J R Jobbins

down. The young partially-developed heads looking like a bundle of soft curled ends. The barren fronds widest and shortest. The fertile come out later, and then only when long transplanted. Sori towards the margin, and brought seemingly yet nearer to it by the fertile pinnulets being most turned over. May. Deciduous. A marsh plant, not uncommon in boggy places. Rather difficult to remove, on account of its fibrous and straggling root, but doing well if duly supplied with moisture. Best transplanted small.

ASPLENIUM.

Sori on the back, in oblique lines. Indusium attached on the outer side. Root tufted in all.

Asplenium Adiantum Nigrum. (*Black Spleenwort.*) Fig. 11. From 3 to 6 inches, when found on walls, from thence to 20 when on shady hedge-banks. Growing in rather circular masses. Frond oblong-triangular. Pinnæ from about half-way up, alternate, oblong-triangular, the lower inclining to turn horizontally, and slant upwards. Pinnules thick, leathery, shining, pointedly-toothed, broad-stalked, irregularly wedge-shaped, and tapering again towards their

apex, the larger sometimes running into secondary pinnæ. When on exposed walls more rigid and pointed, and yellowish instead of dark green, and the roots more fibrous and extended. Does best when taken from banks; if from the former, losing its difference under cultivation. Sori abundant, linear at first, afterwards more oval, uniting, and swelling over the sides of the pinnules. May. Evergreen. Common. Rather variable in form. Very hardy and ornamental.

——— Alternifolium. (*Alternate-leaved Spleen-wort.*) Fig. 35. From 2 to 5 inches. Growing in masses. A plain stem, throwing out from about half-way up several narrow, distant, alternate, roundly-notched, oblong, thin-stalked, pinnæ, having two or three distinct lines of sori crowded on their under surface, which ultimately meet in the centre; the lower pinnæ being divided again into two or more similar alternate pinnules. May. Indeciduous. Very rare. Rocks in the North. Requires a glass. Of no particular interest.

——— Filix Fœmina. (*Lady Fern.*) Fig. 23. From 1 to 3 feet. Growing in masses. In its size and general character appearing rather to belong to the genus

Aspidium, to which it has sometimes been referred. The shape of the sori also would almost rank it intermediately, they being, more or less according to age, variations, &c. like an elongated and rather straightened kidney, and therefore a mixture of the forms of both genera. Very compound. Fronds light, feathery, succulent, generally drooping, and while young and tender not unfrequently soon shrivelling up after being gathered. Pinnæ alternate, commencing near the bottom, and much abbreviated there. Pinnules very short-stalked, sometimes hardly to be called so, and verging on mere pinnulets, numerous, long, narrow, deeply and repeatedly divided and toothed; in some a trifle more expanded and closer together; in others apart and contracted; but in all thin and slender. Sori appearing on the yet curled-up head, and covering the back of the pinnule eventually so abundantly, that it is supposed that in twenty years a single plant might, in its increase, clothe the whole surface of the earth. End of May. Deciduous, and early cut down by the frosts of autumn. Very changeable in form, tint of colour, flexibility, &c. besides distinct and rarer varieties, tasselled, forked, and so forth. Common. Easy of

cultivation. Most graceful, elegant, and free growing.

——— Fontanum. (*Smooth Rock Spleenwort.*) Fig. 17. From 2 to 5 inches. Growing in masses. Dullish green. Frond rigid, erect, narrow, and tapering most downwards. Stem with a rather lighter border along both sides. First rudiments of pinnæ beginning near the bottom. Pinnæ alternate, short, and very blunt. Pinnules thick in texture, much widening upwards, cut into bristled angles at their apex, and sloping off at the base into a stalk-like junction with the pinna. Sori in the centre, and eventually uniting. May. Evergreen. Rare, if yet existing in any natural locality. Perhaps on rocks or walls in the North. Succeeds well, but requires protection. A pretty diminutive plant.

——— Lanceolatum. (*Lanceolate Spleenwort.*) Fig. 9. From 4 to 12 inches. Growing in masses. Frond widest in the centre, and contracting both ways. Pinnæ alternate, shortish, bluntly-tapering, and from about a third upward. Pinnules simple, alternate, broadly wedge-shaped, stalked, and toothed. Sori somewhat towards the margin, inclining to round, eventually uniting, but not so as quite to

cover the whole pinnule. May. Evergreen. Not common. Chiefly on rocks by the sea-side in South and West. Difficult of cultivation, requiring a sheltered, moist, but not damp, warm, position and atmosphere. Ornamental.

——— Marinum. (*Sea Spleenwort.*) Fig. 12. Usually from 6 to 12 inches, though occasionally taller. Growing in masses. A stem bearing on either side, from about one-third upwards, simple, short-stalked, leathery, shining, darkish green, somewhat oblong-egg-shaped, undivided, mostly alternate, pinnæ, having a kind of elbow above next the stem, and notched throughout except at the base, about an inch long in the middle of the frond. Sori never uniting. June. Evergreen. Not uncommon on the sea-coast. Removed with difficulty and hazard, from the adherency of its roots to the rocks. Requires a glass, but then succeeds fairly.

——— Palmatum. (*Mule Fern.*) Fig. 40. From 6 to 12 inches. A simple, undivided, shoot or frond, of the appearance and texture of the Scolopendrium, only thinner in substance, heart-shaped below, but the indentations higher, with lateral projections on the lower half of each side, either rounded or triangular; oblong-triangular

above; and bound by a slight, raised, bleached, border all round the frond. Sori numerous, either in single oblique lines between the midrib and edge of both the centre and the projected sides, indusia attached sometimes outwardly and sometimes inwardly; or in double, indusium attached inwardly, and opening back to back. It can hardly, therefore, be ranked as a true Asplenium, and yet still less as a Scolopendrium, though assigned to the former genus. Not yet recognised by any authority as a native. July. Deciduous. Found in Essex. Lancashire. Ireland. Common in Portugal and Madeira, &c.

——— Ruta Muraria. (*Wall Rue.*) Fig. 30. From 1 to 5 inches. Growing in tufts, and embedded in the crevices and joints of walls. A slender stalk sending out, from about half-way up, little alternate pinnæ (occasionally running into secondary ones also), having pinnules very variable in form, sometimes long-stalked, toothed, and simply wedge-shaped, or contracting also to a roundish point above; or almost diamond; or cut off abruptly, as it were, at the top, and yet toothed there; or the pinnæ themselves simple, round, broad, oval, or scalloped, and either smooth or jagged on their edges. Sori ultimately

joining over the whole pinnule. May. Indeciduous. Common. Not very easy of cultivation; fails frequently from the roots being injured in removal, and from change of soil; and shrivels under heat and sunshine. A pretty little thing, but of no especial beauty.

——— SEPTENTRIONALE. (*Forked Spleenwort.*) Fig. 19. From 1 to 4 inches. Growing in masses. A grass-like spike, dull green, except at the base where purplish, divided near the top into two or three sharp-pointed, alternate, thicker, toothed, forks; or in the smaller fronds merely toothed itself; containing on the back two or more separate lines of sori, which eventually, throwing off their indusia, occupy the whole space. May. Indeciduous. Rare. Rocks in the North. Succeeds fairly. Safest under glass. Of little comparative interest.

——— TRICHOMANES. (*Common Maidenhair.*) Fig. 32. From 3 to 10 inches. Growing in circular masses. A shining, smooth, purplish, stem, bearing on each side, almost from the bottom, little, round, or oval, dark dull green, simple, usually opposite, rather horizontally turned, pinnæ, slightly more or less uneven on their edges. April. Indeciduous. Sori ulti-

mately uniting over the whole. Common. Shrivels under heat and sunshine, and fails otherwise occasionally when taken from walls. From hedgerows more successful, and larger. Ornamental, but not peculiarly striking or curious.

——— VIRIDE. (*Green-stalked Spleenwort.*) Fig. 34. From 2 to 8 inches. Growing in circular masses. Resembling the preceding, except that the stem is greener, the pinnæ lighter in colour, alternate, regularly indented, somewhat wedge-shaped, and narrowed a trifle to both ends. Sometimes the fronds are forked above. Sori, when fullest and united, not quite extended to the margin. May. Sometimes earlier. Evergreen. Rare. Northern rocks. Not easy of removal, from the tenacity of its roots. Succeeds fairly. Safest under glass.

BLECHNUM.

Sori on the back, in two longitudinal lines near the centre. Indusia attached on the outer side, and parted on the inner by the midrib.

BLECHNUM BOREALE. (*Northern Hard Fern.*) Fig. 26. Barren fronds from 9 to 12 inches: fertile from 12 to 20. Root tufted.

Growing in masses. A long, leathery, frond, tapering at both ends, cut on each side into very narrow, simple, undivided, smooth-edged, convex, obtuse, alternate, pinnæ, or sometimes quasi-pinnæ, a trifle curved upwards, and shortening towards the bottom, till they become mere rudimental projections, all appearing like a mere blunt half-diamond till drawn out by growth. The fertile fronds fewer, erect, rigid, and nearer the centre of the plant, their decided pinnæ not beginning till much higher up the stem, being considerably narrower and further apart. Sori one line on each side of the midrib along the whole pinna. Indusia fixed outwardly, and opening face to face inwardly. Common in marshy, boggy, situations, as well as in company with A. Oreopteris on dry heaths. End of May. Deciduous. Slow of fructification, and not otherwise satisfactory in cultivation. Best removed large, and in bearing. Curious and rather striking in the fertile fronds. Confounded by some writers with the foreign genus Lomaria, but distinguished from it by the position of its indusium.

BOTRYCHIUM.

Sori naked, on a fertile, compoundly-branched, spike, rising above a single, barren, leafy, pinna (or frond, see Glossary). No indusium.

Botrychium Lunaria. (*Common Moonwort.*) Fig. 28. Fertile spike from 3 to 6 inches; single barren pinna shorter. Root of thick, smooth, yellow, fibres. Growing solitarily. A very singular-looking plant, stem hollow and succulent, throwing off, at about a third upward, a single barren, horizontally-turned, pinna, having on each side very peculiar stalked pinnules (somewhat resembling the sliding wooden hand-screens hawked about in the streets, rather more than half unfurled), occasionally deeply notched throughout to their base. The stem itself, continuing upward, has, near the top, other very short, alternate, compound, offshoots, on which, or on the spike itself, are arranged the theeæ in regular lines. Variations in both the fertile and barren portions have been found. End of April. Early deciduous. Not uncommon on open heaths and pastures, where the soil is peaty, but not very wet. Difficult of cultivation. Should be

kept moderately dry, cool at the root, with fresh air, in rich vegetable soil, and be transplanted in the spring, while yet dormant. Curious, but of no particular interest or beauty. This and Ophioglossum alone grow up straight, and not curled inward crosier-fashion. The Botrychium is that which was formerly supposed to have magical powers, if duly gathered by moonlight.

CISTOPTERIS.

Sori on the back, in round masses. Indusium bladder-shaped, attached under the sori at the part furthest from, and opposite to, the points of the pinnule; eventually retorted, or cast off entirely.

Cistopteris Fragilis. (*Brittle Bladder Fern.*) Fig. 21. From 5 to 10 inches. Root tufted. Growing in masses. A very lovely little tender plant, extremely delicate, yet hardy, coming out early, going off late, and throwing out successions of fronds continually. Light green. Frond tapering acutely to a fine point above, and contracting downwards also. Pinnæ commencing near the bottom, apart, opposite, or alternate, in some forms rather horizon-

tally turned. Pinnules soft, thin, oval, with a slight fulness at the base outside, asunder, frequently incised and toothed. Sori scattered, but towards the edge, numerous, appearing on the undeveloped head, and at length uniting. April. Deciduous. Common in hedges, banks, and walls. Very changeable in shape. Easy of cultivation, and takes most freely. Very ornamental. It assumes sometimes a larger and more oblong frond, pinnæ and pinnules further distant, the latter more deeply divided and sharper pointed, sori less prominent, and is then called Angustata; or a smaller, pinnules blunter, rounder, and less indented, sori less inclined to run together, and is then Dentata. The only drawback to this elegant little thing is, that under treatment out of doors it often becomes subject to a red mildew.

Distinct varieties are

——— Alpina. (*Alpine Bladder Fern.*) Usually from 2 to 6 inches, but occasionally higher. Root tufted. Growing in masses. More compound, rounder, and less pointed, in the pinnules; pinnæ shorter, blunter, and somewhat inclining to alternate; in both broader and closer. Sori towards the

24
Cryptogramma
Crispa
25
Adiantum
Capillus Veneris.
26
Blechnum Boreale

margin. Rare. Probably towards the North. Tender and pretty.

——— Dickieana. From 4 to 6 inches. The simplest of the family. Pinnæ opposite, short, obtusely-tapering; pinnulets closer together, broad, rounder, and merely jagged. Both overlapping their neighbour. Sori marginal. Found by Dr. Dickie, in a sea-cave near Aberdeen.

——— Montana. (*Mountain Bladder Fern.*) From 4 to 8 inches. Root creeping. Growing in masses. Frond triangular. Pinnæ on the upper third only of the stem, and mainly alternate; the lowest being much the largest, and having secondary ones on their inferior side; that next the stem the greatest, and at some distance from it, and becoming nearer sized with that above on each primary pinna upwards gradually. Texture very thin and frail. Sori scattered. Extremely rare. Only in a few places in Scotland. Very elegant.

CRYPTOGRAMMA.

Sori circular beneath the recurved margin of the pinnule. No Indusium.

Cryptogramma Crispa. (*Rock-brake or Parsley Fern.*) Fig. 24. Fertile fronds from 3 to

8 inches. Barren more numerous and rather shorter. Root tufted. Growing in masses. Very delicate and compound. Barren frond not unlike much divided and crisped parsley. Pinnæ alternate; on the larger, secondary ones alternate also. Pinnules small, thin, stalked, indented, and somewhat wedge-shaped; opposite or alternate. Fertile narrower. Pinnæ more opposite, secondary and pinnules markedly alternate; pinnules stalked, oblong-oval. Sori distinct, though soon uniting into a line, and partially concealed by the reflexed margins of the pinnule, which almost meet behind. May. Early deciduous. Rocks, stones, and walls, in the mountainous districts of the North. Easy of cultivation. Tender, pretty, and graceful.

GRAMMITIS.

Sori on the back, in lines: back scaly.
No Indusium.

GRAMMITIS CETERACH. (*Scaly Grammitis.*) Fig. 37. From 3 to 6 inches. Root tufted. Growing in circular masses. A low, broadish, plant, composed of mere long, simple, leathery, shoots, or fronds, incised

and rounded into deep-cut, oblong, alternate, scallops on each side, fringed at first with white on their edges; the under surface whitish also, intermixed with brown, but shortly becoming coloured like rusty iron; clothed with chaffy scales concealing the sori. End of April. Evergreen. Common on walls, especially in the West. Succeeds well. Likes watering, but shrivels under excessive heat, sunshine, and frost.

HYMENOPHYLLUM.

Sori contained in little two-valved vessels, springing from the pinnæ, and adjoining the stem. No Indusium.

Hymenophyllum Tunbridgense. (*Tunbridge Filmy Fern.*) Fig. 38. From 1 to 3 inches. Root creeping, with minute, twisted, and entangled, fibres. Growing up therefrom irregularly, but not far asunder. Dark green. Stem very slight and hair-like; and from the pinnæ upwards bordered by a skinny, clouded, margin. The tiny mostly alternate pinnæ are forked into separate, simple, semi-transparent, networked, undivided, prickly, lines, occasionally, however, split at their apex, and nearly resembling in appearance of texture some kinds of sea-

weed. The fibres of the root form themselves into a thick matted mass with the mosses, and so forth, among which they live. The seed-cup, where present, is in the room of the fork of the pinna that is next the stem, and is composed of two roundish valves, folding the one over the other, and is notched at the top, and not stalked. June. Evergreen. Rather uncommon. Devonshire. The Lakes, Wales, and elsewhere. On the surface of damp rocks, and hanging down. Difficult of cultivation, and unsatisfactory. It should be, with its aggregation of soil, root, &c. planted on porous stone, bedded with sand, kept under glass in a shady situation, and frequently watered. Elegant and delicate.

——— Wilsoni. (*Northern, or Wilson's Filmy Fern.*) Fig. 33. From 1 to 3 inches. Like the preceding, but more rigid, curved above, pinnæ narrower, less full, and inclining downwards; stem faintly and partially bordered. When in bearing, the cups turn in one direction, and the pinnæ in the other. The cups or seed-vessels are larger, valves more rounded, stalked, with smooth lips above, somewhat like the end of a duck's bill, instead of being cut off, and notched. Similar situations and localities. June. Evergreen.

27
Ophioglossum
Vulgatum
28
Botrychium
Lunaria
29
Osmunda Regalis
30
Asplenium Ruta Muraria

Treatment as before. The former species may be fancifully resembled to the little bough of a young Scotch fir, with its fresh shoots; the latter to that of the spruce. This genus, with that of Trichomanes, wishing to be always so much damper than the rest, it were advisable to place them in a case by themselves.

OPHIOGLOSSUM.

Sori naked, on a fertile simple spike.
No Indusium.

Ophioglossum Vulgatum. (*Common Adder's Tongue.*) Fig. 27. From 3 to 9 inches. Root of a few, short, stout, yellow, fibres, running horizontally. Growing up solitarily. A round, hollow, succulent, stem, bearing, on the upper part, a simple spike issuing from the sheath of a smooth, oblong-oval, tapering, concave, undivided, and unnotched, leafy, horizontally-turned, pinna (or frond, see Glossary); and embedding on either side, at top, a single row of yellow thecæ; the whole, therefore, somewhat in appearance of the character of the Arum, or Lord and Lady. Barren pinna sometimes found split at top, or two spikes instead of, as usual, only one.

Like the Botrychium, springing up straight, and not curled inwards. May. Early deciduous. Not uncommon in moist pastures and meadows. Tolerably easy of cultivation. Of no comparative interest.

OSMUNDA.

Sori naked, on a fertile, compoundly-branched, spike, surmounting a succession of barren, leafy, pinnæ. No Indusium.

Osmunda Regalis. (*Flowering Fern.*) Fig. 29. From 2 to 3 feet in dry, from 8 to 10 in damp, sheltered, situations. Root tufted. Stem cane-like, very tough, and wiry. Fronds springing up rather under one another. Pinnæ far apart, and mainly opposite. Pinnules simple, undivided, smooth, very short-stalked, narrow, oblong, slightly tapering to their apex, with more or less of a protuberance at the base; originally very tender, and of a reddish colour, changing afterwards to a dull green, and a trifle jagged throughout. Fertile branched spike, where existing, above the leafy pinnæ (which occasionally even themselves have a sorus or two interspersed here or there), and beautifully embraced by them while yet undeveloped. The fructi-

fication is composed of bunches of clustered theeæ, green when young, and ripening into brown. April. Deciduous. Common in marshes and damp situations. Easy of cultivation. Hardy. Best transplanted large. Though wanting in the waving varied traceery of outline in the pinnule, which favourably distinguishes so many of the tribe, yet justly admired for the contrast it affords by its fine bold appearance.

POLYPODIUM.

Sori on the back, in round masses, perfectly naked. No Indusium. Root creeping in all.

Polypodium Alpestre. (*Alpine Polypody.*) Fig. 13. From 12 to 18 inches. Growing in masses. Frond narrow and tapering to both ends. Pinnæ opposite below, more alternate above. Pinnules very thin and delicate, longish, succulent, hardly-stalked, toothed, and somewhat roundly divided, throughout. Sori towards the top of the frond, forming two rows along the pinnule, one little cluster being in each division of it. End of May. Deciduous. Only yet found in one or two places in the High-

lands of Scotland. Not very easy of cultivation, but growing plentifully where it does take. A peculiarly elegant and graceful plant (totally unlike any other of the genus), overlooked in this country till within the last very few years, in consequence of its similarity to Asplenium Filix Fœmina. Var. Flexile, more distinct-looking, pinnules more apart, narrower, less frequently, but more deeply, sharply, and widely, toothed.

——— Calcareum. (*Lime, or Rigid Three-branched Polypody.*) Fig. 39. From 6 to 12 inches. Growing in masses. Dusky green. Frond stout, rigid, oblong-triangular, concave; the stem running into three, as it were, at a bent angle and knot in the lowest pinnæ, which are horizontally turned, and inclining upwards, the leader forming its continuation. Pinnæ opposite, somewhat alternate above, and incomplete. Pinnules (or, as getting higher and higher, simple pinnulets or mere scallops) oblong, furrowed, deeply notched throughout, and, in the larger, divided almost to the midrib; having on the back small, yellow, shining, glands, yielding, in the young fronds, a pleasant but short-lived perfume when drawn across the nose. In the first stage, it appears like three tiny

Polypodium
Calcareum
40
Asplenium
Palmatum
41
Polypodium
Phegopteris
Polypodium Vulgare
42
43
Polypodium
Dryopteris

J F Jobbins

balls; and in the next, but while the pinnules are yet rolled up, often resembles a single or double budded cross. Sori marginal, white, afterwards black. April. Deciduous. In limestone districts. Succeeds well. Very hardy, bearing drought and exposure, and throwing out fresh and fresh fronds continually. Ornamental.

——— Dryopteris. (*Oak or Tender Three-branched Polypody.*) Fig. 43. From 4 to 10 inches. Growing in close masses. Something of the character of the preceding in its threefold arrangement, but otherwise impossible to be mistaken for it. Light vivid green. Frond shorter, obtusely-triangular, drooping, convex. Stem slighter. Pinnæ opposite, fewer, wider, shorter, and more abruptly tapering, incomplete above. Pinnules and pinnulets broader, smooth, and thinner in substance, and not glandulous nor scented. The whole a much more succulent and tender plant. Sori marginal. April. Deciduous. Chiefly in the North. Not so hardy, preferring shade and moisture. Both are ornamental and singular in their full top springing from so slender a stem, as though they were diminutive trees.

The drawback to the genus is, that the roots creep-

ing horizontally along underground (Vulgare, however, rather on the surface), are not only somewhat more difficult of removal than when they are tufted, but throw out their fronds more arbitrarily, here and there, apart from the site originally chosen for them. They, however, hereby propagate more extensively, and are better protected from the weather.

———— PHEGOPTERIS. (*Mountain or Beech Polypody.*) Fig. 41. From 6 to 14 inches. Pale green. Pinnæ opposite, the lowest pair inclining downwards; quasi-pinnæ on the upper portion of the frond uniting together at their base, and connected with the stem by an increased breadth of foliage. Pinnulets simple, oblong, rounded, thin, succulent, fringed with woolly hair, and slightly uneven on their edges. Sori marginal. May. Deciduous. Rocky, damp, sheltered, places, and stony woods, chiefly in the North. Prefers shade and moisture.

———— VULGARE. (*Common Polypody.*) Fig. 42. From 6 to 16 inches. To be met with almost everywhere on trees and walls, hanging down in tresses, with plain, long, narrow, smooth, simple, alternate, quasi-pinnæ, sometimes slightly waved on the edges, joined together at the base. Sori prominent, white, ripening into yellow, in two series equi-distant from the

centre and the margin. End of May. Indeciduous. Easy of cultivation. Rarer varieties exhibit the pinnæ forked at top; or notched all round; or deeply incised into even or indented quasi-pinnulets. Of these, the last, Cambricum (barren and much later), is the most curious and worthy of notice, its fronds being somewhat of an oval form, and the pinnæ bulging out so much in their centres as to leave an oblong round of light all down near the stem. Its native locality is North Wales.

PTERIS.

Sori on the back, forming a continuous line along the margin. Indusium attached to the slightly-recurved edge of the pinnulet.

Pteris Aquilina. (*Common Brake, or Female Fern.*) Fig. 18. Ordinarily from 2 to 3 feet, but rising occasionally as high as 7 or 8 feet. Root long and fibrous, creeping horizontally; very succulent, and deeply embedded below, throwing up its solitary fronds at intervals, which soon cover large patches of ground. A tall, erect, tree-like, stem, velvety at its base, very brittle at first, afterwards tough and wiry, with simple, lateral, protuberances at top,

which become more and more compound downwards, until at last running into extended, stem-like, pinnæ, with secondary ones on them, bearing long, narrow, smooth-edged, round-pointed, leathery, pinnulets, turned over a little on their margins, themselves often with obtuse projections like the rudiments of a yet further multiplication of parts. Pinnæ more or less opposite, and the under ones somewhat approaching to those of Polypodium Calcareum, at a slightly bent angle; quite horizontally turned. The lower end of the stalk, when cut across in any direction, presents the exact figure of an oak. Pinnulets sometimes more recurved and sharper. Extremities, when young, brown, downy, and curled up. Often destroyed by the spring frosts. Sori along the border of every sinuosity of the pinnulet, but seldom quite to its apex. Indusium fringed with hairs. May. Deciduous. Very common. Difficult to transplant, and afterwards preserve with success. It should be removed in large masses for the sake of the root, and when in a dormant state; or little independent plants taken from a pasture or sloping bank, *where there are no large ones*, the smaller and younger the better, with much bole of earth, and reset

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Scolopendium Vulgare.

where they are to grow, as soon as possible, for the next year; care being had that the roots be never uncovered or touched. It becomes thinner and more delicate under cultivation. The grandest of the whole tribe, and that whose wondrous and hidden seed, if fortunately obtained, was to render its bearer invisible.

SCOLOPENDRIUM.

Sori on the back, in twin oblique lines. Indusia attached on the outer side, and lapping one over the other on the inner.

SCOLOPENDRIUM VULGARE. (*Common Hart's Tongue.*) Fig. 31. From 6 to 18 inches. Root tufted. Growing in masses. A long, smooth, polished, dark green, simple, undivided, leathery, riband-like, shoot or frond, pointed at the top, heart-shaped at the base, and generally more or less crisping and undulating at the sides, on a shortish shaggy stem. Sori in twin lines, covered by what looks like a single indusium, but really is two, one continued in its whole length partially over the other, afterwards thrown asunder in opposite directions. Sori soon meeting, and seeming also like only one, though always, on the frond being

bent back, separating again down the middle. In early stages of its growth, the folding over of the indusium can be clearly perceived through a lens. Along the centre pith of the stem internally are four black hairs. May. Evergreen. Common. Easy of cultivation. Rarer varieties are found, more waving on the edges, indented, forked at top, and so forth. Its bold and simple form well suited to contrast with the so different and compound aspect of the majority of the other genera.

TRICHOMANES.

Sori in entire cups, springing from the pinnæ, dispersed. No Indusium.

TRICHOMANES BREVISETUM. (*Bristle Fern.*) Fig. 36. From 6 to 12 inches. Root thick, fibrous, and creeping. Growing up at intervals therefrom rather solitarily. Stem with a thinner, filmy, border, like its shadow, on each side. Frond oblong-triangular. Pinnæ alternate. Pinnules alternate, and incised into a succession of rounded forks or projections, smooth on the edges, and of semi-transparent network texture, resembling seaweed. Nerves very prominent. Oftentimes not so com-

pletely developed. The young fronds, in their earlier stage and before at all evolved, frequently look dry, brown, and dead. Of the character of the genus Hymenophyllum, but more compound in form. The seed-cup, where existing, takes the place of a fork of the pinnule, whether near to or distant from the main stem, entire, and of a longish, equable, shape, like the letter U rather drawn out; having a spike or hair projecting from its centre. The variety of Andrewsii is narrower, longer, and more drooping. June. Evergreen. Only in Ireland. Creeping along the face of dripping rocks and eaves. Pendulous. Easy and satisfactory in cultivation under glass, away from the light, *with frequent watering*, and not too deeply set in. Does not absolutely require, but thrives best with, pebbles at the roots and elsewhere, and in a warm room. A very lovely plant, and when wetted, one of the, if not the, most beautiful of the whole tribe. This, with the Hymenophyllums, desiring so much more moisture than the rest, and so little soil, it were desirable to give them a glass plate and cover to themselves.

WOODSIA.

Sori on the back, in round masses. Indusium attached under them, and splitting above into hair-like divisions or fine threads.

Woodsia Hyperborea. (*Round-leaved Woodsia.*) Fig. 20. From 2 to 4 inches. Root tufted. Growing in masses. Pinnæ mainly alternate, short, blunt, wide, triangularly-formed, and rounded into little scallops above and below, the superior being a trifle the largest. Under surface covered with hairy scales. Sori marginal, full-sized; ultimately uniting. May. Deciduous. Difficult of cultivation. Very rare. Northern. Of no particular beauty or interest.

——— Ilvensis. (*Oblong Woodsia.*) Fig. 22. From 2 to 4 inches. Root tufted. Growing in masses. Pinnæ slightly alternate, oblong, rather tapering, deeply and widely incised, rounded at the incisions, and hairy. In the larger, running into distinct pinnulets. Under surface clothed with reddish, chaffy, scales. Sori smaller, scattered, towards the margin, and eventually uniting. May. Deciduous. Very rare. Northern. Difficult of cultivation, and of no peculiar interest.

19
Asplenium
Septentrionale
20
Woodsia
Hyperborea
21
Cistopteris Fragilis
22
Woodsia
Ilvensis.
23
Asplenium
Filix Fœmina.

GLOSSARY.

N.B.—In compound terms the first qualifies the second.

ACUMINATE, tapering off to an acute point.

ADNATE, joined to that on which it grows by its whole breadth of foliage; connected.

ADPRESSED, close to the stem.

ALLOSORUS, the name used by some writers for the Cryptogramma.

ALTERNATE, branches or leaves succeeding each other interchangeably, first on one and then on the other side.

ANASTOMOSE, to run one into the other.

ANNULATE, ferns that have a ring round their seed-cases.

ANNULUS, the jointed ring to the seed-case.

ANTHER, the vessel containing the fertilizing farina, affixed to the top of the stamen or barren filament of a flower or blossom.

ARISTATE, terminating in a bristle; awned.

ARTICULATED, jointed.

ASPLENIUM GERMANICUM, the name used by some writers for the Alternifolium.

ATHYRIUM, a separate genus assigned by some writers to the Asplenium Filix Fœmina.

ATTENUATING, growing gradually narrower; tapering

AURICLED, having a kind of projecting elbow.

AWNED, terminating in a bristle; aristate (avena)

AXIL, the inner end of the base on the superior side. the angle formed by the branch and stem

AXILLARY, at the base on the superior and inner side.

BIDENTATE, twice-toothed.

BIFID, cleft in two.

BIPINNATE, having branches themselves pinnate, *i. e.*, bearing on them lateral offshoots cut quite down to the stem.

BI-TRI, twice or thrice.

BIECHNUM SPICANT, the name used by some writers for the Boreale.

CALICIFORM, like the calyx or cup of a flower

CAPILLARY, fine thread- or hair-like.

CAUDEX, the part under or on the ground, from which the frond springs; popularly the root; to which the fibres or actual roots are attached.

CELLULAR, consisting of little cells or cavities.

CETERACH OFFICINARUM, the name used by some writers for the Grammitis.

CILIATED, fringed with hair.

CIRCINATE, coiled inwards, like a watch-spring

CLAVATE, club-shaped, thinner at the base, and thicker upwards.

COMPOUND, complex; multifidous; composed of many parts or divisions.

COMPRESSED, a cylinder, more or less flattened in its roundness.

CONCOLOROUS, of one uniform colour.

CONFLUENT, meeting; running together; uniting

CONNATE, joined at the base.

CONNECTED, formed on the stem itself, as the base of its entire width; adnate.

CONVOLUTED, rolled together; curled inwards.

CORDATE, heart-shaped.

CORIACEOUS, leathery.

COTYLEDONS, the perishable side-lobes of the seed, which furnish nourishment to the embryo plant.

CRENATE, CRENULATE, } notched, indented.

CRENATURES, notches; indentations.

CROWN, the rounded top of the root projecting above the ground.

CRYPTOGAMOUS, whose principle of fecundation is not apparent.

CUCULLATE, shaped like a hood, cowl, or bladder.

CUNEATE, wedge-shaped, widening upwards.

CYLINDRICAL, formed like a round tube.

DECIDUOUS, losing its leaves in the winter.

DECOMPOUND, divided yet further beyond tripinnate.

DECURRENT, tapering off, without any distinct leaf-stalk, into junction with, and thickening, the stem by running down it.

DEFLEXED, bending or curving downwards.

DEHISCING, bursting open.

DELTOÏD, trowel- or triangular-spear-shaped.

DENTATE, toothed.

DEPAUPERATED, lessened; contracted; impoverished.

DIAPHANOUS, transparent.

DICHOTOMOUSLY, forkedly, into two branches.

DIGITATE, like the human fingers.

DISTICHOUS, two-rowed or ranked.

DORSAL, on the back.

DORSIFEROUS, bearing seed on the back.

EVERGREEN, retaining its leaves during the winter, whether changed in colour or not (confined to the latter sense herein).

EXANNULATE, ferns not having a ring round their seed-cases.

EXSERTED, projected beyond the margin of its continent, or sheath.

FALCATE, shaped like a reaping-hook.

FILIFORM, thread-shaped.

FLABELLIFORM, fan-shaped.

FLEXUOUS, winding; crooked; zigzag.

FROND, the main stem with its branches, leaves, &c.; critically, the leafy portion only.

FRUCTIFICATION, FRUIT, } the seed, seed-vessels, and their appendages.

FURCATE, forked.

GIBBOUS, bulged out.

GLABROUS, bald; smooth.

GLAUCOUS GREEN, hoary grey green, like the back of a cabbage-leaf.

GRUMOUS, thick; clotted.

GYRATE, curled up.

HABITAT, the native home of a plant, where it grows indigenously.

HERBACEOUS, succulent; juicy.

HYBRID, a mixed plant composed of two species.

HYBRIDIZATION, the commingling or running of plants of different species one with the other.

HYMENOPHYLLUM UNILATERALE, another name for the Wilsoni.

IMBRICATED, laid one under the other, like tiles.

IMMERSED, sunk within the margin of its continent or sheath.

INDECIDUOUS, retaining its leaves during the winter, whether changed in their colour or not (confined to the former sense herein).

INDUSIUM, the cover over the mass of seed-cases.

INVOLUCRE, used by some writers for Indusium; or specially as regards the Woodsia, and the cups of the Hymenophyllum and Trichomanes.

LACINIATED, jagged.

LANCEOLATE, narrow-oblong-triangular above, and contracting again below; lance-shaped.

LASTREA, the name used by some writers for that portion of the genus Aspidium which has a kidney-shaped Indusium.

——— FŒNISECII, the Aspidium Recurvum.

LATERAL, springing from the side of the root, stem, &c.

LATO, in composition, broadly; widely; for example,

——— LANCEOLATE, fuller in the centre, and therefore tapering off more obtusely.

LIGULATE, shaped like the blade of a paper-cutter; linear.

LINEAR, resembling the broad flat portion of a dinner-knife.

LOBED, divided more or less deeply down into scallops, or parts rounded at their edges.

LOBE, scalloped portion of the leaf between its divisions; or leaf itself, or branch, when not cut down quite to the stem; sometimes used for perfect leaf.

LOAM, fat, unctuous, earth; marl.

LUNATE, crescent-shaped.

MEMBRANEOUS, MEMBRANOUS, MEMBRANACEOUS, semi-transparent, and of the texture of skin, or very thin parchment (membrana).

MIDRIB, the main ridge or fibre running down the centre of the whole leaf.

MONOPHYLLOUS, single-leaved; undivided; entire.

MONSTER, an anomalous variety.

MUCRONATE, ending abruptly in a sharp point.

OBOVATE, egg-shaped, the small end downwards.

OBSOLETE, contracted; indistinct; imperfect.

OPPOSITE, springing from the same level on both sides of the stem.

ORBICULAR, round; globe-shaped.

OVATE, egg-shaped, large end downwards.

PALEACEOUS, chaffy; husky.

PANICLE, an irregular bunch of flowerets.

PECTINATE, apart, like the teeth of a comb

PEDICEL, a little leaf-stalk.

PEDICELLATE, having a little leaf-stalk

PELTATE, target-shaped.

PENTAGONAL, five-angled or cornered.

PERSISTENT, abiding in leaf during the winter.

PETIOLE, leaf-stalk.

PETIOLED, } stalked.
PETIOLATED, }

PHÆNOGAMOUS, whose principle of fecundation is apparent.

PINNA, the lateral offshoot from the main stem, when perfect leaf, or perfect leafy branch; secondary or partial, the smaller branch springing from the primary one.

PINNATE, having lateral offshoots distinctly cut down to the stem.

PINNATIFID, having incomplete branches or leaves, their divisions not reaching down to the stem.

PINNULE, the leaf on a branch.

PISTIL, the fertile filament, or little column, in the interior of a flower or blossom.

POLLEN, the fecundating farina of a plant.

POLYSTICHUM, the name used by some writers for that portion of the genus Aspidium which has a round Indusium.

PROCUMBENT, lying down along the ground; not springing upwards.

PUBESCENCE, down, or woolly hair.

PUBESCENT, clothed with soft wool, down, or hair.

QUADRATE, squared.

RACEME, a bunch of irregular flowerets.

RACHIS, the main stem from the branches upwards, sometimes used for the whole stem; secondary or partial, the same correspondently on the branches.

RECEPTACLE, the portion of the veins to which the seed-cases are attached.

RECURVED, } turned or curved back.
REFLEXED, }

RENIFORM, kidney-shaped.

RETICULATED, of fine net-work texture.

RHIZOMA, the part under or on the ground from which the frond springs, or root commonly so called, to which the fibres or real roots are attached; the caudex.

RHOMBOIDAL, diamond-shaped, only rather broader one way than the other.

ROOT, the main mass at the bottom of the plant whereout it grows, including the fibres; in description the former.

SECUND, pointing one way.

SEGMENT, divided portion of the leaf; or the leaf itself when joined to its neighbour by their bases; lobe.

SERRATE, toothed like a saw.

SERRATURES, saw-like indentations.

SESSILE, tapering off without any distinct leaf-stalk and merging presently in the stem.

SILICIOUS, composed of hair-like substance

SIMPLE, single; plain; uncompounded.

SINUATE, } bending; crooked; serpentine
SINUOUS, }

SINUS, the inner end of an indentation.

SORUS, an aggregated mass of theeæ or seed-cases

SORIFEROUS, seed-bearing.

SPINULOSE, spinous; bristly.

SPORES, seeds.

STAMEN, the barren filament or thread-like column in the interior of a flower or blossom.

STIGMA, the point of the pistil or fertile filament in the interior of a flower or blossom, receiving the farina.

STIPES, the main stem below the branches; secondary or partial, the same correspondently on the branches.

STOMATA, the respiratory pores or openings.

STRIATED, scored or furrowed.

SUB—prefixed, acts as a diminutive; incompletely, in a modified degree.

SUCCULENT, soft; sappy; pulpy.

TERETE, columnar; cylindrical; round.

TERMINAL, springing from the end of the root, &c.

TERNATE, three-branched or leaved at the same point.

THECA, seed-vessel or case.

TOMENTOSE, cottony.

TORTUOUS, twisting; winding; crooked.

TRAPEZIFORM, having four unequal sides.

TRICHOMANES RADICANS, used by some writers for the Brevisetum.

TRIDENTATE, triply-toothed.

TRIFID, cleft into three.

TRIPINNATE, having secondary branches themselves pinnate, or bearing on them lateral offshoots divided down to the stem.

TRUNCATE, lopped off abruptly.

TUFTED, clustered; growing in bunches or swellings.

Umbelliferous, where a number of stalks springing from one centre produce a round of flowerets above, umbrella-fashion.

Unilateral, growing all on one side only.

Urceolate, pitcher- or vase-shaped.

Vascular, consisting, or full, of vessels.

Veins, the fibres, nerves, or ridges, of a leaf.

Venation, mode of disposition or arrangement of the veins or nerves.

Venules, smaller veins or fibres.

Vernation, mode of growth of the young undeveloped frond.

Winged, having a thinner, slighter, border, running down the side.

Woodsia Alpina, the name used by some writers for the Hyperborea.

END.

Robert Hardwicke, Printer, 36, Duke Street, Piccadilly

APPENDIX.

The following suggestions may be perhaps welcome to the commencing cultivator of Ferns.

For out-of-doors.

Choose a sheltered and shady situation—if under the defence of a wall the better—and one looking north or west. Make up your raised bed with a light soil, largely intermixed with frequent rough porous stones. Front it with rock-work, wherein to fix, especially, the smaller and wall kinds; the larger and more feathery being of course placed behind in the bed itself. Set them not in too closely together, and remember that those having creeping roots will often extend themselves, and reappear in adjacent spots. If the ground slopes too much, many are inclined to slide downward into the lower positions. Water before planting, and from time to time as needed; but let there be opportunity of drainage, so that the bed never becomes marshy or sour; as though *Osmunda* and *Aspid. thelypteris* like this, and some few others, as *Blechnum*, *Aspid. spinulosum* and *dilatatum*, can endure it, to the majority it would be injurious, if not fatal. Should the heat of summer be too great, and shrivel up any of the tender plants, they may be restored, and kept in order by duly watering at night. The wild plants may be removed at any season of the year, though the autumn is the

fittest. In the winter many will have died down, till hardly discernible, except to a practised eye. A fresh addition of peat, or leaf mould, seems to be the only manure yet recommended. The more delicate sorts may, perhaps, be well covered in from the frost by straw or heaps of leaves.

For in-doors.

In constructing your case, it were advisable to add a false gridiron bottom, an inch or two above the outer one, for drainage sake, having a fountain below. On this lay a net-work of horse-hair, or the like, to prevent any earth from stopping up or sinking through the interstices of the former. On this place an inch of cinders, and then your compound of peat-earth and silver-sand, raising it just above the rim of the side: this should also be generally interspersed with pieces of rough, porous stone, to some of which the plants should be attached. It should *never* be *damp*, or the plants will decay with mildew and perish (though in a very hot room this is of less consequence); a very slight moisture is all that is required; just enough, in fact, to create a little condensation on the cover above (which should be on hinges, and fitting into a groove). Should this be wanting, a slight sprinkling with soft water should be resorted to, lukewarm of course in winter; where too great, the glass should be wiped dry every morning. This glass must be kept clear and bright, the occasional admission of air during the operation of cleaning it being beneficial rather than the reverse, provided a pretty equable temperature be preserved between the outward and inward atmosphere. The soil before being used should be carefully sifted, to prevent any worms or insect-eggs being admitted with it. Any appearance of blight may be cured by the application of lime-water.

The case itself should not be placed in too retired a part of the room (except as regards that containing *Trichomanes brevisetum*, or *Hymenophyllum*), as the natural tendency of the plants to creep towards the light would thereby be increased.

ERRATA.

Page 4, line 4, *for* "number" *read* "member."
,, 18, ,, 28, *for* "long" *read* "short."
,, 45, ,, 14, *add*, except the first, where tufted.
Fig. 31, *for* "Scolopendium" *read* "Scolopendrium."